Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] We claim:

1. A self-monitoring flow-through heater, comprising:
(a)a passageway providing a flow conduit; and
(b)a wire disposed in the passageway, for heating and monitoring temperature of a fluid flowing through the tube; the wire having a high specific resistivity and a high temperature coefficient of resistance, so that monitoring voltage across and/or current through the wire measures mean temperature of the wire and thereby indirectly of the fluid in the passageway.

[c2] 2. The self-monitoring flow-through heater of claim 1, wherein the specific resistivity of the wire is greater than about one-half ohm-meters.

[c3] 3. The self-monitoring flow-through heater of claim 1, wherein the temperature coefficient of resistance of the wire is greater than about two-tenths percent per degree Centigrade.

[c4] 4. The self-monitoring flow-through heater of claim 1, wherein monitoring voltage across the wire and/or current through the wire comprises:(c) connecting a cur-

rent/voltage-sensing resistor in series to the wire ;

(d) applying a constant voltage by a voltage regulator and a first potentiometer;

(e) amplifying the voltage sensed across the current/voltage-sensing resistor;

(f) comparing the amplified voltage by a comparator with a set-temperature voltage generated by an adjustable voltage divider comprising a fixed resistor and a second potentiometer; and

(g) automatically turning on a first switch and providing an additional path to ground for the voltage regulator through a third potentiometer, when the amplified sensed voltage drops below the set-temperature voltage, thereby lowering the voltage applied to the wire by the voltage regulator.